

Rhinebeck Village's work on restoration of Floodplains & Riparian Buffers 2019

Research Excerpts

We are submitting research where the Village partnered with Marist College. Of particular relevance to this PE are the following excerpts from the Marist research (2019):

P.28 “In order to increase flood mitigation, it is in the best interest of the village to invest in the repair and preservation of these riparian zones, and to incorporate mindful environmentally friendly strategies in future urbanization projects and developments. It is suggested that the most effective method of flood mitigation is the modification, establishment, repair, and/or protection of the riparian zones along the Landsman Kill, (Mondal & Patel, 2018). Besides the conservation of riparian zones, green engineering designs and methods should be implemented in any future developments. (Iarrapino & Attorney, 2014), (Flynn & Davidson, 2016). It is the professional suggestion of multiple individuals, and the conclusion of the conducted research, that these two factors be the major focus of the efforts of the Village of Rhinebeck to prevent and control flooding.”

P.30 Plantings: “...and it is, therefore, the suggestion to reinforce the vegetation along the stream banks of the Landsman Kill where applicable to do so. Targets species should be native to the lower Hudson Valley area as to decrease species competition and eliminate the probability of invasive species having adverse biological diversity effects on the ecosystems.”

P.31 Green Urban Engineering: “Environmentally friendly engineering is essential for future development within the Village of Rhinebeck, and the surrounding lands of the Landsman Kill. Appendix C: Urban Engineering, encompasses multiple different designs taken from Urban Street Stormwater Guide, (National Association of City Transportation Officials, 2017). While there are many ways to implement green designs, it is most notable to mention the selection of semi-permeable pavements, (Keefe, 2011), (Murphy, 2018), bioretention/filtration designs (NACTO, 2017), and even community-based efforts such as implementing rain gardens, (EPA, 2018b), (Kim, 2018), (Alyaseri et al., 2017). Most of the development of urbanized areas results in the removal of permeable sediments and soils or the paving over such surfaces with non-permeable pavements for roadways, foundations, parking lots, etc. This drastically increases the surface runoff waters that cannot percolate through the pavements, through the soils, and into the groundwater. The increased surface stormwater runoff is collected through storm drains in the streets, and this water is redirected to other areas that may not be suited to handle the increased fluctuation of the water. One notable location is the newly constructed storm drains in the village that drains directly into the site of concern, Crystal Lake. With the increased stormwater runoff, Crystal Lake is exposed to an increased flow of water that would otherwise disperse through the soils. With this in mind, future developments or modification should consider the needs of the space, and the changes the development will create. In order to decrease the issue these urbanized developments impose, semi-permeable pavements and other non-traditional resources can be utilized instead of traditional asphalt and concrete, as

seen with the Taconic Regional Office (Keefe, 2011). In a cost benefit analysis, it is shown that the initial investments with permeable pavements outweigh the negative fiscal consequences that non-permeable pavements impose. (Murphy, 2018).”

P.35 suggested native plants that would thrive in riparian zones in Rhinebeck Village’s soil type. “There are five native trees and shrubs that have been thoroughly researched based on moisture absorption, soil adaptability, flood tolerance, root depth, and growth rate. Additional characteristics and species can be found in Appendix D....*Cephalanthus occidentalis*, button bush; *Carya ovata*, Shagbark Hickory; *Rhododendron viscosum*, swamp azalea; *Cornus amomum* is usually referred to as silky dogwood; *Rosa paulustris*, commonly known as swamp rose; *Betula nigra*, commonly known as river birch; *Alnus Serrulata*, the Hazel Alder/Speckled Alder; *Salix bebbiana*, Bebb willow; *Salix discolor*, may be better known as pussywillow”